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invention. For example, FIG. 20 illustrates magnetic field generator 136 in the form of a coil through which a current can flow to produce a magnetic field, e.g., a field B, along an axial direction thereof. A change in the magnitude of the current flowing through the coil can cause a change in the strength of the magnetic field, and a change in the direction of the current flow can cause a change in the direction of the field. In a preferred embodiment, the coil 136 forms a resonant circuit with an inductor and a capacitor to produce an oscillating magnetic field having a predefined frequency, for example, a frequency that is substantially similar to mechanical vibrational frequency of the diaphragm of the diaphragm pump of FIG. 9. Such a magnetic field generator can be employed, for example, to tune the focusing performance of the embodiment of the intraocular lens of the invention shown in FIG. 8 or 17.

FIG. 21 illustrates another magnetic field generator 138 that can be utilized to externally adjust the refractive power of an intraocular lens of the present invention. The magnetic field generator 138 includes a magnet having a North pole ("N") and a South pole ("S"). Magnetic field lines 138a emanate from the North pole and terminate at the South pole. The field generator 138 can be positioned in the proximity of a patient's eye having an IOL of the invention such that at least some of the magnetic field lines 138a penetrate the eye. A rotation of the field generator external of the eye can then cause, for example, a rotating magnetic field that can be utilized in a number of embodiments of the invention, such as the embodiment having a peristaltic micro-pump.

FIG. 22 illustrates another magnetic field generator 140 that can be utilized in various embodiments of the present invention for adjusting the focusing performance of the IOL. The magnetic field generator 140 includes an electromagnet 140a for generating a magnetic field, such as a field represented by field lines 140b. A reversal of a current through the electromagnet results a reversal of the direction of the magnetic field. Further, the strength of the magnetic field can be changed by increasing or decreasing the current flowing through the electromagnet. Such a magnetic field generator can be employed as an external energy source, for example, in the embodiments of the invention having a gear pump or a peristaltic pump, or a piezoelectric driven pump.

One skilled in the art will appreciate further features and advantages of the invention based on the above-described embodiments. Accordingly, the invention is not to be limited by what has been particularly shown and described, except as indicated by the appended claims. All publications and references cited herein are expressly incorporated herein by reference in their entirety.

What is claimed is:

1. An intraocular lens, comprising

an optical chamber for receiving an optical fluid and having at least a flexible region deformable under influence of a fluid,

a refractive optical fluid having an index of refraction greater than about 1.337,

a reservoir for storing an optical fluid and being in fluid communication with said chamber,

a valve for regulating the fluid communication between said optical chamber and said reservoir.

2. The IOL of claim 1, further comprising a pump capable of being actuated by an energy source positioned external of the eye for pumping the optical fluid between said reservoir and said optical chamber to modify a volume of said refractive fluid within said optical chamber to adjust a focusing performance of said lens.

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3. The IOL of claim 2, wherein said pump causes flow of a selected volume of the optical fluid between said reservoir and said optical chamber after said lens is implanted in the eye to selectively vary an amount of the fluid in the optical chamber, thereby selectively varying the focusing performance of said lens.

4. The IOL of claim 2, further comprising at least one lens movable in response to movement of the fluid to vary focusing performance of the IOL.

5. The IOL of claim 2, wherein said source produces a magnetic field for actuating said pump.

6. The IOL of claim 5, wherein said magnetic field is oscillatory.

7. The IOL of claim 5, wherein said magnetic field is a rotating field.

8. The IOL of claim 2, wherein said pump is a peristaltic pump.

9. The IOL of claim 8, wherein said peristaltic pump has a tubular structure.

10. The IOL of claim 9, wherein said tubular structure is formed of an elastic material having magnetic particles therein.

11. The IOL of claim 10, wherein said magnetic particles are distributed within said elastic material such that a rotating magnetic field applied to said tubular structure induces a propagating deformation in said structure.

12. The IOL of claim 11, wherein said magnetic particles are selected from the group consisting of Samarium, Neodymium, Cobalt, Iron, Nickel, Boron, ferrite, magnetic, and nickel cobalt.

13. The IOL of claim 9, wherein a slit within said tubular structure forms said valve.

14. The IOL of claim 2, wherein said pump includes a gear pump.

15. The IOL of claim 14, wherein said gear pump includes two inter-locking gears.

16. The IOL of claim 15, wherein one of said gears is magnetic.

17. The IOL of claim 16, wherein said external energy source applies a rotating magnetic field to said magnetic gear to cause rotations of said inter-locking gears, thereby causing transfer of the fluid between said optical chamber and said reservoir.

18. The IOL of claim 14, wherein said gear pump is formed of silicone rubber and further comprises a magnetic gear with a permanent magnet.

19. The IOL of claim 2, wherein said pump is a diaphragm pump.

20. The IOL of claim 19, wherein said diaphragm pump is configured to be magnetically actuated.

21. The IOL of claim 19, wherein said diaphragm pump is configured to be electrically actuated.

22. The IOL of claim 19, wherein said diaphragm pump includes a housing having an inlet opening and an outlet opening, and a flexible diaphragm disposed to be in mechanical communication with said housing.

23. The IOL of claim 22, wherein said flexible diaphragm is configured to have at least one resonant vibrational frequency.

24. The IOL of claim 22, wherein said flexible diaphragm is magnetic.

25. The IOL of claim 24, wherein said external source applies an oscillatory magnetic field to said flexible diaphragm to cause a mechanical oscillation thereof, thereby actuating said pump.

26. The IOL of claim 25, wherein said oscillatory magnetic field has an oscillation frequency substantially similar to